

## Patent claims

1. Method for matching the data rate of a data stream in a communications device,

5 - where the data stream can be subdivided into at least one data block containing transmission bits to be transmitted

- where the transmission bits are formed from a coding process from input bits bearing information,

10 - in which, to match the data rate, specific transmission bits are removed (punctured) from a data block of the data stream,

- where the transmission bits which are to be removed are specified by a puncturing pattern,

15 - and the puncturing pattern is designed such that transmission bits are preferably removed which are dependent via the coding process on few input bits.

the puncturing pattern is made up of the following steps:

- Determining a cumulative puncturing strength which specifies which component of the information bits was removed from the data block by removal of transmission bits,

20 - Formation of a decision function depending on the cumulative puncturing strength,

- Minimization of the decision function to determine the puncturing pattern.

2. Method for matching the data rate of a data stream in a communications device,

25 - where the data stream can be subdivided into at least one data block containing transmission bits to be transmitted

- where the transmission bits are formed from a coding process from input bits bearing information,

30 - in which, to match the data rate, specific transmission bits are removed (punctured) from a data block of the data stream,

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- where the transmission bits which are to be removed are specified by a puncturing pattern,

- and the puncturing pattern is designed such that transmission bits are preferably removed which are dependent via the coding process on few input bits and the puncturing pattern is embodied in such a way that, by puncturing, viewed from the front end of the data block to be punctured, a section consists of a section of the following sequence (bit positions): 1, 4, 2, 3, 8, 7, 5, 6, 15, 12, 14, 11, 10, 9, where "1" corresponds to the first bit position.

3. Method for matching the data rate of a data stream in a communications device,

- where the data stream can be subdivided into at least one data block containing transmission bits to be transmitted

- where the transmission bits are formed from a coding process from input bits bearing information,

- in which, to match the data rate, specific transmission bits are removed (punctured) from a data block of the data stream,

- where the transmission bits which are to be removed are specified by a puncturing pattern,

- and the puncturing pattern is designed such that transmission bits are preferably removed which are dependent via the coding process on few input bits and the puncturing pattern is embodied in such a way that, by puncturing, viewed from the back end of the data block to be punctured, a section consists of a section of the following sequence (bit positions): 0, 4, 6, 1, 2, 15, 12, 14, 10, 9, 7, 4, 5, 18, 13, 8, where "0" corresponds to the last bit position.

4. Method in accordance with one of the preceding claims in which the puncturing pattern uses a puncturing rate to specify the gap

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between the transmission bits to be removed, in which case the puncturing rate differs for different areas in the data block.

5. Method in accordance with Claim 3 in which the puncturing rate  
5 in the middle area of the data block features essentially  
equidistant gaps between the bits to be removed.
6. Method in accordance with one of the previous claims,  
characterized in that  
The puncturing pattern is embodied in such a way that 8 of 48  
10 bits are punctured and these are the bits 1, 2, 4, 8, 42, 45,  
47, 48.
7. Method in accordance with one of the previous claims,  
characterized in that  
The puncturing pattern is embodied in such a way that 31 of 111  
15 bits are punctured and these are the bits 1, 2, 3, 4, 5, 6, 7,  
8, 12, 14, 15, 24, 42, 48, 54, 57, 60, 66, 69, 96, 99, 101, 102,  
104, 107, 108, 109, 110, 111.
8. Method in accordance with one of the previous claims,  
characterized in that  
20 The puncturing pattern is embodied in such a way that 14 of 54  
bits are punctured and these are bits 1, 2, 3, 4, 7, 8, 36, 39,  
42, 48, 51, 52, 53, 54.
9. Method in accordance with one of the previous claims 1 through 8  
characterized in that  
25 The puncturing pattern is embodied in such a way that 14 of 54  
bits are punctured and these are bits 1, 2, 3, 4, 7, 8, 39, 45,  
48, 51, 52, 53, 54.
10. Method for matching the data rate of a data stream in a  
communications device

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- where the data stream can be subdivided into at least one data block containing transmission bits to be transmitted
- where the transmission bits are formed from a coding process from input bits bearing information,
- in which, to match the data rate from a data block of the data stream, specific transmission bits are repeated,
- where the transmission bits to be repeated are specified by a repetition pattern,
- and the repetition pattern is designed such that transmission bits are preferably repeated which are dependent for the coding process on many input bits and or which the repetition pattern is made up of the following steps:
  - Determining a function of a cumulative repetition strength which specifies,
  - which component of the input bits was repeated by repeating transmission bits in the data block,
  - Formation of a decision function depending on the cumulative repetition strength,
  - Maximization of the decision function to determine the repetition pattern

11. Method according to Claim 10  
characterized in that

The repetition rate of the repetition pattern which specifies the gap between the bits to be repeated essentially requires equidistant gaps in the middle area of the data block and at the edge of the data block requires gaps that are large enough for no bit to be repeated

12. Method according to one of the previous Claims 10 to 11  
characterized in that

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the repetition pattern is designed in such a way that 4 of 36 bits are repeated and these are the bits 16, 18, 20, 22.

13. Method according to one of the previous claims

5 characterized in that  
The data block in which the rate matching is performed comprises data coded with a convolution code.

14. Communications device

10 with a rate matching device (6) for puncturing or repetition of a data block of a data stream directed to the rate matching device (6) in accordance with a specific rate matching pattern for matching the data rate of the data stream, where the rate matching device uses puncturing or repetition of the rate matching pattern to remove or repeat corresponding bits in the  
15 data block.

characterized in that,  
the rate matching device (6) is embodied such that it performs rate matching with a puncturing pattern or repetition pattern which is embodied in accordance with one of the previous claims  
20 1-13.

15. Communications device according to Claim 16

characterized in that,  
the communications device (1) is a mobile radio transmitting or receiving device, especially a UMTS mobile radio transmitter or  
25 UMTS mobile radio receiver.